

Application No.: 09/758,606
Filed: January 11, 2001
TC Art Unit: 2644
Confirmation No.: 9889

REMARKS

The foregoing Amendment is filed in response to the official action dated December 19, 2005. Reconsideration is respectfully requested.

The status of the claims is as follows:

Claims 1-27 are currently pending.

Claims 1-27 stand rejected.

Claims 11, 15, 20, and 25 have been amended.

Claim 26 has been canceled without prejudice.

The Examiner has rejected claims 1-4, 8-10, 12-14, and 25-26 under 35 U.S.C. 103(a) as being unpatentable over Norris (USP 5,885,129) in view of Croft III et al. (USP 6,584,205) and further in view of Kuhl (ACUSTICA, Vol. 4, 1954, No. 5, "Condenser Transmitters and Microphones with Solid Dielectric for Airborne Ultrasonics"). Further, the Examiner has rejected claim 5 under 35 U.S.C. 103(a) as being unpatentable over Norris in view of Croft III et al. in view of Kuhl and further in view of the Applicant's admitted prior art and Johnson et al. (USP 5,394,732). Moreover, the Examiner has rejected claim 6 under 35 U.S.C. 103(a) as being unpatentable over Norris in view of Croft III et al. in view of Kuhl and further in view of Babcock (USP 3,565,209). The Examiner has also rejected claim 7 under 35 U.S.C. 103(a) as being

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unpatentable over Norris in view of Croft III et al. in view of Kuhl and further in view of Seeler (USP 3,373,251). In addition, the Examiner has rejected claim 11 under 35 U.S.C. 103(a) as being unpatentable over Norris in view of Croft III et al. in view of Kuhl and further in view of Rush (USP 4,991,221). In addition, the Examiner has rejected claims 15-17, 19, and 27 under 35 U.S.C. 103(a) as being unpatentable over Norris in view of Croft III et al. in view of Kuhl and further in view of William Jr. et al. (USP 5,406,503). In addition, the Examiner has rejected claim 18 under 35 U.S.C. 103(a) as being unpatentable over Norris in view of Croft III et al. in view of Kuhl and further in view of William and Thompson (USP 4,122,725).

The Applicant respectfully submits, however, that the official action has failed to establish a *prima facie* case of obviousness, and therefore the various rejections of the claims under 35 U.S.C. 103 listed above are unwarranted and should be withdrawn.

For example, claim 1 recites a parametric audio system for generating at least one airborne audio beam, including at least one audio signal source for providing at least one audio signal, at least one signal conditioner for receiving the audio signal and for nonlinearly processing the signal to provide at least one pre-

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distorted signal, a modulator for receiving the pre-distorted signal and for converting the signal into ultrasonic frequencies, and an acoustic transducer array including at least one acoustic transducer, in which the array receives the converted signal and projects the signal through the air along a selected path, thereby inverting the distortion in the projected signal and regenerating the audio signal along at least a portion of the selected path with reduced net distortion. As recited in claim 1, the acoustic transducer array has a bandwidth greater than 5 kHz.

It is well settled that the discovery of the source of a problem may result in a patentable invention despite the fact that the solution would have been obvious once the source of the problem was discovered. Eibel Process Co. v. Minnesota and Ontario Paper Co., 261 U.S. 45 (1923). The Applicant respectfully submits that the art of record neither teaches nor suggests the discovery of the problem solved by the parametric audio system of claim 1, and therefore the official action fails to establish a *prima facie* case of obviousness.

Specifically, the official action indicates that the Norris reference discloses a parametric audio system for generating at least one airborne audio beam that includes at least one audio signal source for providing at least one audio signal. The

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official action further indicates that the Norris reference discloses an acoustic transducer array having a bandwidth greater than 5 kHz. Moreover, the official action indicates that although the Norris reference does not disclose at least one signal conditioner for nonlinearly processing the audio signal to provide at least one pre-distorted signal, the Croft reference discloses pre-processing an audio signal for lowering signal distortion and for better reproducing an acoustic signal for a parametric array output. In addition, the official action indicates that the Kuhl reference discloses a condenser type transducer.

The Applicant respectfully submits, however, that the art of record, including the Norris, Croft, and Kuhl references, neither teaches nor suggests the purpose for which the parametric audio system of claim 1 provides an increased ultrasonic bandwidth, i.e., greater than 5 kHz, for generating airborne audio signals. As described in the instant application, the Applicant's purpose for increasing the ultrasonic bandwidth in the claimed parametric audio system is derived from his discovery that a sufficiently wide bandwidth is required for reproducing a nonlinearly processed ultrasonic signal with reduced distortion (see, e.g., page 3, line 30, to page 4, line 3, page 6, lines 2-6 and 21-25, page 21, line 28, to page 22, line 4, of the application).

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Although the Norris reference discloses a toy weapon capable of emitting a sonic compression wave having a frequency equal to 5 kHz, the Norris reference is completely devoid of disclosure relating to the need for increased ultrasonic bandwidth to reduce distortion in parametric audio systems. Further, the Kuhl reference is silent regarding the acoustic bandwidth for reproducing ultrasonic signals. Moreover, although the Croft reference discloses a system for pre-processing an audio signal to reduce distortion, the Croft reference discloses nothing about reducing signal distortion by increasing ultrasonic bandwidth. In fact, the Croft reference teaches reducing signal distortion in a system having a decreased bandwidth requirement (see, e.g., column 3, lines 20-24, of Croft III et al.). Clearly, the combined teaching of the Norris, Kuhl, and Croft references is diametrically opposed to the Applicant's approach to reducing distortion in his claimed parametric audio system. In addition, the Applicant respectfully submits that the Johnson, Babcock, Seeler, Rush, William, and Thompson references fail to cure the deficiencies of the Norris, Croft, and Kuhl references.

Because the combined teaching of the art of record would not have suggested to one skilled in this art the discovery of the problem solved by the system of claim 1, i.e., the discovery of

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the need to provide an increased bandwidth for reproducing pre-processed ultrasonic signals with reduced distortion, the Applicant respectfully submits that a *prima facie* case of obviousness has not been established. Even if a *prima facie* case of obviousness were established, the Applicant further submits that the suggested combination of the Norris, Kuhl, and Croft references still would not render base claims 1 and 25 and the claims dependent therefrom obvious. This is because neither the Norris reference, the Kuhl reference, nor the Croft reference teaches or suggests a parametric audio system in which an acoustic transducer array has a bandwidth greater than 5 kHz, as recited in claims 1 and 25. As discussed above, the Norris reference merely discloses a toy weapon for emitting a sonic compression wave having a frequency equal to 5 kHz. Further, the Kuhl and Croft references fail to cure this deficiency of the Norris reference. The combined teaching of the Norris, Kuhl, and Croft references therefore would not suggest to one skilled in this art the subject matter of claims 1 and 25. Accordingly, it is respectfully submitted that the rejections of base claims 1 and 25 and the claims dependent therefrom under 35 U.S.C. 103 are unwarranted and should be withdrawn.

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The Examiner has rejected claims 20-24 under 35 U.S.C. 103(a) as being unpatentable over Norris in view of Croft III et al. in view of Kuhl and further in view of the Applicant's admitted prior art and Beaver (USP 4,005,382). The Applicant respectfully submits, however, that claim 20, as amended, and claims 21-24 dependent therefrom, are patentable over the art of record.

For example, amended base claim 20 recites a parametric audio system for generating at least one airborne audio beam, including at least one audio signal source for providing at least one audio signal, at least one signal conditioner for receiving the audio signal and for nonlinearly processing the audio signal to provide at least one pre-distorted signal, a modulator for receiving the pre-distorted signal and to convert the pre-distorted signal into ultrasonic frequencies, at least one driver amplifier for receiving the converted signal, in which the converted signal is an undivided signal, the driver amplifier for generating at least one amplified signal representative of the undivided converted signal, an acoustic transducer array including a plurality of acoustic transducers, the array for receiving the amplified signal and for projecting the amplified signal through the air to invert distortion in the projected signal and to regenerate the audio signal with reduced net distortion, a matching filter for

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compensating for a non-flat frequency response of the combination of the acoustic transducer array and the driver amplifier, and a delay circuit for applying at least one predetermined time delay to the converted signal.

The official action indicates (with reference to claim 11) that Norris fails to disclose a matching filter. The Applicant respectfully submits that like the Norris reference, the Croft, Kuhl, and Beaver references also fail to disclose a matching filter, as recited in amended claim 20. In addition, the Applicant points out that the Rush reference (cited with reference to claim 11) merely describes a traditional loudspeaker crossover network, which divides a signal among many different drivers, each having a preferred frequency range of operation. In contrast, the parametric audio system of claim 20 operates to compensate for the non-flat response of the transducer itself - no signal dividing occurs at all. For at least these reasons, the Applicant respectfully submits that the combined teaching of the Norris, Croft, Kuhl, and Beaver references would not suggest to one skilled in this art the subject matter of amended claim 20 and the claims dependent therefrom. Accordingly, it is respectfully submitted that the rejections of claims 20-24 under 35 U.S.C. 103 should be withdrawn.

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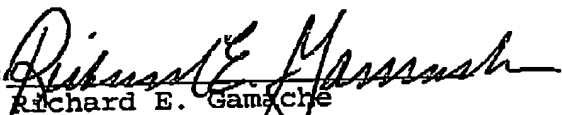
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In view of the foregoing, it is respectfully submitted that the present application is in a condition for allowance. Early and favorable action is respectfully requested.

The Examiner is encouraged to telephone the undersigned Attorney to discuss any matter that would expedite allowance of the present application.

Respectfully submitted,

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